

Guidance for Medical Examiners and Pathologists Regarding Influenza-Related Pediatric Mortality

Bureau of Epidemiology, Michigan Department of Community Health (MDCH)
October 2007

Please contact your local health department or the MDCH Bureau of Epidemiology (517-335-8165; after hours 517-335-9030) for any questions, case consultation or investigation coordination.

Reporting Rationale

Pediatric deaths due to influenza are an indicator of the severity of an influenza season and are a key component of state and national influenza surveillance.

In response to an increase in influenza-associated pediatric mortality recorded during the 2003-2004 influenza season, the Centers for Disease Control and Prevention (CDC) and the Council of State and Territorial Epidemiologists (CSTE) have listed pediatric mortality associated with influenza infection as a nationally reportable condition.

The Michigan Department of Community Health (MDCH) and CDC have also requested that any unexplained pediatric death with evidence of an infectious process be reported. These cases are of epidemiological interest and investigations can lead to a better understanding of circulating pathogens in Michigan.

Case Definition

An influenza-associated pediatric mortality is defined as death in a patient less than 18 years of age resulting from laboratory-confirmed influenza infection.

Lab confirmation is a positive result from one of the following test methodologies:

- Rapid antigen test
- Direct or indirect fluorescence assay (DFA/IFA)
- Viral culture
- Reverse-transcriptase polymerase chain reaction (RT-PCR)
- 4-fold rise in influenza hemagglutination inhibition antibody titer in paired acute and convalescent sera

MDCH encourages any questions or discussion relative to any cases that may not fit the above definition but are noteworthy due to their clinical presentation, laboratory results or pathology. Particular attention should be paid to possible co-infections with influenza and *Staphylococcus aureus*, as an increasing number of these cases have been reported nationwide by CDC.

Reporting and Investigation Procedures

1. To report an influenza-associated or unexplained pediatric mortality, please immediately contact the Communicable Disease section at your local health department, or alternatively MDCH at (517) 335-8165 (after hours at (517) 335-9030). Local health departments will then immediately contact MDCH.
2. The local health department and/or MDCH will request relevant medical and laboratory records for review. This documentation will most often include hospital records and autopsy reports from the medical examiner/pathologist and other medical staff.
3. In coordination with local health departments, MDCH will work with the medical examiner/pathologist to coordinate the collection of relevant clinical samples and accompanying documents for submission to the MDCH Bureau of Laboratories (see Specimen Collection/Submission section on the following page).
4. Specimens will be processed and forwarded to the CDC. Once received, it can take several weeks to months to obtain final results. Results will be sent to both the medical examiner/pathologist and MDCH. MDCH will forward results to the local health department.

Specimen Collection/Submission

1. Viral antigens may be focal and sparsely distributed in patients with influenza. Larger airways have the highest yield for detection of influenza viruses by the IHC staining method performed by the CDC.

Ideal samples to be collected are:

1. Central (hilar) lung with segmental bronchi
2. Right and left primary bronchi
3. Trachea (proximal and distal)
4. Representative pulmonary parenchyma from the right and left lung

A minimum of 8 tissue blocks or fixed tissue samples representing a sample of the above sites should be submitted if available.

2. Additional samples from representative organs, especially those showing significant gross or microscopic pathology that may be related to influenza infection (such as myocarditis, encephalitis, rhabdomyolysis), should be submitted as well. Examples include:

1. Myocardium from the right and left ventricle
2. CNS including cerebral cortex, basal ganglia, pons, medulla, and cerebellum
3. Skeletal muscle

3. If available, influenza test specimens such as rapid test samples or viral cultures should be sent to MDCH Bureau of Laboratories for viral culture confirmation. Shipping for these specimens requires different conditions and will be arranged separately.

4. Unexplained pediatric deaths with no evidence of influenza infection may require different samples, which will be decided on a case-by-case basis.

5. Acceptable specimens (any or all of the following):

1. Fixed, unprocessed tissues in 10% neutral buffered formalin
2. Tissue blocks containing formalin-fixed, paraffin-embedded specimens
3. Unstained sections cut at 3 microns, placed on charged glass slides (10 slides per specimen)

THE ABOVE SAMPLES SHOULD BE SHIPPED AT ROOM TEMPERATURE

6. Additional materials to include with specimen shipment:

1. Autopsy report (preliminary or final if available)
2. Cover letter – include the following items:
 - A. Brief patient clinical history
 - B. Patient lab results (all), influenza vaccination status, and travel history
 - C. Your name, title, mailing address, phone and fax numbers, and email address

7. All shipping must be done in consultation with the MDCH Bureau of Epidemiology.

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